

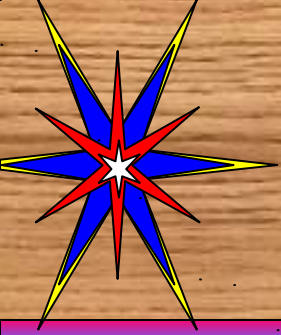
## **Laboratory Issues Enabling Learning Objectives**

- 1. List the drugs or drug categories that are tested at the Army Forensic Toxicology Drug testing Laboratories (FTDTLs).**
- 2. State how long the FTDTL will hold a positive specimen.**
- 3. Select from a list the drug classes that are tested on every specimen and those that are rotational**
- 4. List the personnel who can request a retest for a positive test result**

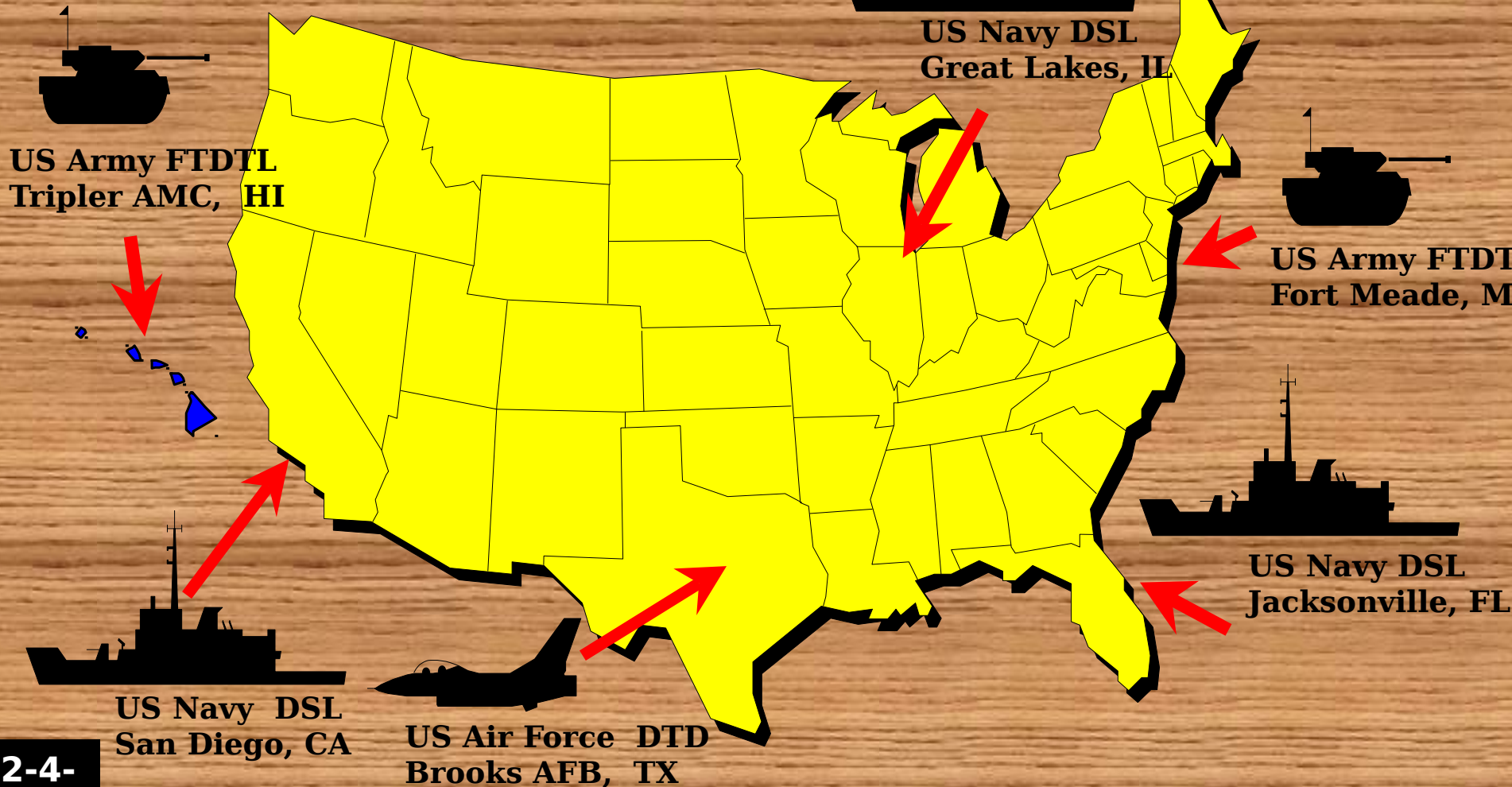


# **DoD Certified Drug Testing Laboratories**

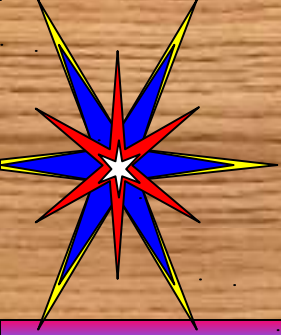
- ▮ **The Armed Forces Institute of Pathology (AFIP) located in Rockville, MD certifies the six drug testing laboratories for DoD.**
  - ▮ **The Navy has three laboratories.**
  - ▮ **The Air Force has one laboratory.**
  - ▮ **The Army has two laboratories.**



# DoD Certified Drug Testing Laboratories







# **DoD Certified Drug Testing Laboratories**

- ▣ **Each laboratory tests their own service's specimens.**
- ▣ **TRI-service command specimens are tested by the service that is directed as the servicing agent. (Southern Command specimens are tested by the Army)**
- ▣ **All new accession testing (MEPS testing) is conducted at the Navy laboratory in Great Lakes, IL.**

**Note: DoD and the services are working to regionalize the six certified laboratories to allow each lab to test all military specimens in their geographical area; an implementation date has not yet been determined.**



# Army Forensic Toxicology Drug Testing Laboratories (FTDTL)

- ▣ The Army has two laboratories called Forensic Toxicology Drug Testing Laboratories (FTDTLs):
  - ▣ **Tripler Army Medical Center, HI tests specimens for:**
    - ▣ The Army National Guard
    - ▣ The Coast Guard
    - ▣ Army specimens from the Pacific Region, Korea, deployed units and primarily the installations west of the Mississippi river.
  - ▣ **Fort Meade, MD tests Specimens for:**
    - ▣ The Army Reserves
    - ▣ Army specimens from Europe, and installations east of the Mississippi river.
    - ▣ Department of the Army Civilian specimens.



# DoD Drug Testing Laboratories

- ▣ **Special testing or circumstances:**
  - ▣ **Deployed units in support of the GWOT will send their specimens to the Tripler FTDTL.**
  - ▣ **All specimens that are to be tested for steroids are sent to the Fort Meade laboratory for processing (Steroid testing will be discussed in more detail in a later lesson)**
  - ▣ **Special test requests for Valium, mushrooms (psilocybin), etc are tested at AFIP.**





# Drugs Tested in all DoD Labs

- ▮ **ALL specimens are tested for Heroin, Cocaine, Amphetamines, THC and currently Heroin.**
- ▮ **In addition, specimens are tested for at least one of the rotational drugs - Opiates, LSD, Oxycodone/oxymorphone and PCP**

**Note: The laboratories quit testing barbiturates on a rotational basis in Jun 05 and began testing Oxycodone/oxymorphone (OxyContin) on a rotational basis in Oct 06.**



# Drugs Tested in all DoD Labs

## ▮ Other Tests Performed

- ▮ **MDMA, MDEA, MDA (Designer drugs such as ecstasy) on all positive Amphetamines.**
- ▮ **Morphine and Codeine on all positive Opiates. Note: Prior to DoD directing heroin testing on all specimens, Heroin testing was performed on all positive Opiates.**

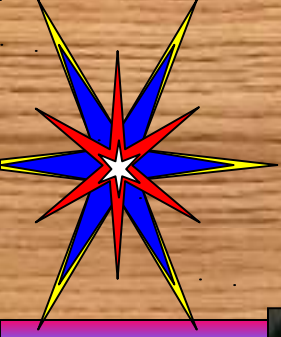
**Note: DoD determines the testing menu for the drug labs and can changed the menu at anytime based on needs of the force. As mentioned the drug labs ceased testing for barbiturates in Jun 05 and began testing specimens for synthetic opiates (Oxycodone and Oxymorphone) in Oct 05.**





# Lab Testing Methodologies

- ▮ **Before a specimen is reported as positive it must test positive three times and by two different testing methods:**
  - ▮ **Immunoassay on a chemical analyzer - initial screening test and re-screening test.**
  - ▮ **GC/MS (Gas Chromatography/Mass Spectroscopy) - confirmation test.**  
**Note: GCMS is the gold standard in drug testing.**



# Laboratory Procedures: Specimen Processing







# Laboratory Procedures: Specimen Processing



- ▮ Specimens are received at the lab normally via USPS, FedEx, UPS or DHL.
- ▮ The Specimen Processing Section:
  - ▮ Opens the Boxes
  - ▮ Inspects the DD Forms 2624 and Specimens and annotates any discrepancies. (Specimens receiving fatal discrepancies will be destroyed)
  - ▮ Each Specimen Bottle receives a Bar-coded Laboratory Accession Number (LAN).
  - ▮ An aliquot (a small portion of the specimen poured into a test tube) is poured on all specimens.





# Laboratory Procedures: Specimen Processing



- ▮ The LAN is used to identify the specimen and its associated aliquots as they are tested throughout the lab. The actual bottle never leaves the specimen processing section.
  - ▮ Negative specimens are destroyed
  - ▮ Positive specimens are saved for one year in a freezer
- ▮ Intra-Laboratory Chain of Custody's are started on the bottle and all aliquots poured from it.

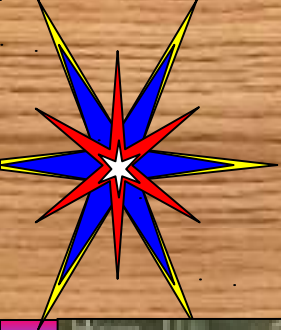


# Laboratory Procedures: Screening



- ▣ The Aliquots are tested for up to 7 drugs on a chemical analyzer (immunoassay methodology)
  - ▣ Good drug specificity & low metabolite sensitivity
  - ▣ Moderate tolerance to interference
  - ▣ Moderate technician expertise
  - ▣ Fast & Cheap
- ▣ Used to screens out the negative specimens - about 98% of all specimens are negative
- ▣ Specimens that test negative are destroyed and reported as negative

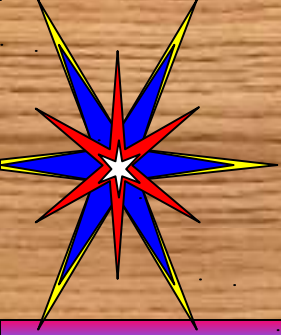
**Note: Metabolite - the remnants of the initial drug after the body breaks it down to be excreted it in the urine. THC is a metabolite of marijuana.**



# Chemical Analyzer







# Laboratory Procedures: Re-screening



- ▮ New aliquot poured from original bottle for testing in specimen processing.
- ▮ Tested by Immunoassay, same as initial screen
- ▮ Specimens are only tested for the drug(s) that initially screened positive.
- ▮ Water blanks in between each aliquot.
- ▮ Specimens that test negative are destroyed and reported as negative



# Laboratory Procedures: Extractions



## ▮ Extractions

- ▮ New aliquot poured from original bottle in specimen processing
- ▮ Drug or drug metabolite is extracted from the urine.
  - ▮ Separates the drug or the drug metabolite from the rest of the urine.
  - ▮ Chemically changes the drug or metabolite for better identification in the last test.

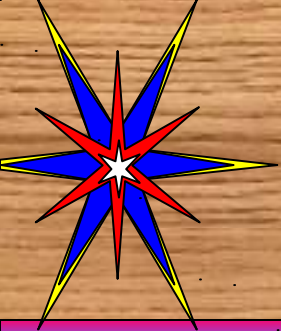


# Laboratory Procedures: Confirmation



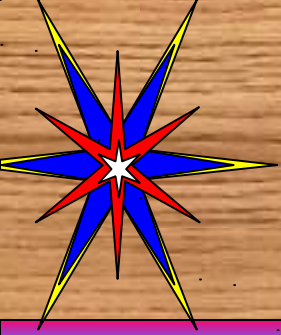
- ▮ **Gas Chromatography/Mass Spectroscopy (GC/MS)**
  - ▮ Identifies and quantifies the drugs
  - ▮ High metabolite specificity & sensitivity
  - ▮ High level technician expertise
  - ▮ Slow and expensive
- ▮ This is the gold standard in the industry. The instrument identifies drugs or metabolites like a fingerprint. If it identifies a drug as LSD then it is LSD.





# Gas Chromatography / Mass Spectrometry





# **Metabolites Confirmed by GC-MS**

- ▣ **11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid (THC metabolite)**
- ▣ **Benzoylecognine (Cocaine metabolite)**
- ▣ **6-Acetylmorphine (Heroin metabolite)**
- ▣ **The rest of the drugs are identified as the drug. (LSD is LSD)**



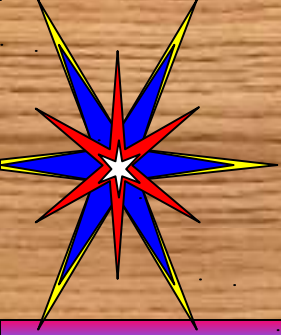


# Laboratory Procedures: Confirmation



- ▮ Specimens that do not confirm as a specific drug are reported as negative and the specimen is destroyed.
- ▮ Specimens that confirm as a drug, but below the established DoD cutoff are destroyed and reported as negative.  
Example: A 14 nanogram per milliliter (ng/mL) THC is reported as negative because the cutoff for THC is 15 ng/mL.





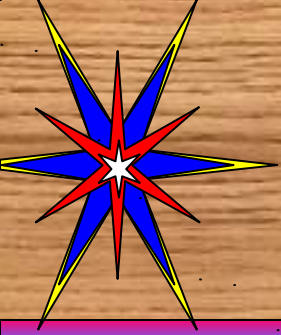
# DoD Established Cutoffs

<u>DRUG</u>	<u>CONFIRMATION (ng/mL)</u>
Amphetamines/methamphetamines	100
Barbiturates (prior to Jun 05)	200
THC	15
Cocaine (Benzoylecgonine)	100
Lysergic Acid Diethylamide (LSD)	0.2
Opiates (Codeine)	2000
(Morphine)	4000
Synthetic Opiates (Oxycodone)	100
(Oxymorphone)	100
Heroin (6-Acetylmorphine)	10
Phencyclidine (PCP)	25



# Drug Detection Times

- ▣ Most drugs that are used on an occasional basis will be eliminated from the body in about 1 - 3 days. Therefore the drug detection time is usually limited to 1-3 days.
- ▣ The detection time does vary with:
  - ▣ Amount of drug taken -higher doses and increased frequency of use can increase detection times.
  - ▣ Food/drink consumed - Drugs are eliminated just like any food or liquid is from the body. The more water consumed in food/drinks the faster the drug is flushed from the body.
  - ▣ Body type of individual - Metabolism



# Drug Detection Windows

<u>Drug</u>	<u>Confirm</u>
THC	1-3 days
Cocaine	1-3 days
Amphetamines	1-2 days
Opiates (Morphine)	1-2 days
(Codeine)	1-2 days
(Heroin)	12-18 hrs
Synthetic Opiates	2-3 days
(Oxycodone)	2-3 days
(Oxymorphone)	8-12 hrs
LSD	1-3 days
PCP	1-3 days
Barbs (testing stopped Jun 05)	





# Laboratory Procedures Certification



- ▮ **Laboratory Certifying Official (LCO)**
  - ▮ **Reviews all Specimen testing data**
    - ▮ **Screening data**
    - ▮ **Confirmation data**
    - ▮ **Chain of Custody**
    - ▮ **DD Form 2624**
  - ▮ **Testifies as expert witness**



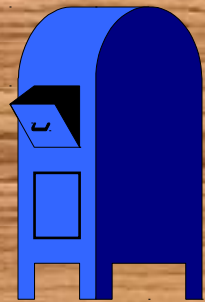
# Laboratory Procedures Results Reporting



- ▣ **Laboratory results are posted on a secure website.**
- ▣ **IBTC or ADCO retrieves results from website.**
- ▣ **Commander or UPL notified of results.**

# Turnaround Time

Specimens are sent to FTDTL



FTDTL receives specimens



**\*\*TURNAROUND TIME STARTS\*\***



Specimens are processed and tested

Certified results are placed in the Laboratory Information Management System (LIMS)



IBTC or who ever receives your results

FTDTL reports the specimen results via website

**\*\*TURNAROUND TIME**



**ENDS\*\***  
Turnaround time averages 1-2 days for negative results and 5-6 days for positive results.

**NOTE:** Some drugs such as designer Amphetamines, Methamphetamine, Heroin, and LSD require additional testing that may slightly increase turnaround time. Steroid testing takes 6-8 weeks.





# Positive Specimen Storage

- ▮ Length of time normally is 1 year
- ▮ Memo from commander required to request an extension



# Retests

- ▣ **A retest is conducted usually at the request of the Soldier who is claiming that the lab must have made a mistake - “retest my sample”.**
- ▣ **Reports presence only, does not have a cut-off value**
- ▣ **Requested by JAG, MRO, commander, or Soldier (through the commander or SJA)**
- ▣ **At any DoD Lab free of charge**
- ▣ **At a National Institute on Drug Abuse (NIDA) Certified Civilian Lab at the Soldier’s expense**



# Lab Video

**All the DoD laboratories conduct drug testing in the same manner. Watch the 5 minute video after closing this presentation.**

**Note: Some of the analyzers in the video have been upgraded, but the process is still the same.**